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# AQUATIC FUNGI FROM NORTH MAHARASHTRA-XII

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ABSTRACT

*The present paper deals with five species of fungi encountered on submerged woody debris and leaves in freshwater habitats. Among them Monodictys trichocladiopsis Goh and Hyde is a new record for the fungi of India. Rhexoacrodictys erecta (Ellis and Everh.) Baker and Morgan-Jones is being recorded for the first time from freshwater habitats in India. Cancellium applanatum Tubaki, Cirrenalia indica Vasant Rao and Reddy and Torula caligans (Batista and Upadhyay) Ellis are being recorded for the first time from Maharashtra state. The data provides information on the distribution of these fungi in India, apart from their description and illustrations.*

KEYWORDS :*MFreshwater, Hyphomycetes, submerged leaves, wood*

Short Profile

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## INTRODUCTION :

Freshwater fungal diversity in Maharashtra state is high, and many freshwater Ascomycetes and Anamorphic (Mitosporic) fungi collected in North Maharashtra region have been published (Borse and Patil, 2006, 2007; Borse and Pawara, 2007; Patil and Borse, 2011a,b, 2012a,b,c, d; Pawara et al., 2011; Patil, 2012, Patil et al., 2012; Wagh and Borse, 2014). In the present paper seven species of fungi encountered on submerged woody debris and leaves in freshwater habitats are described and illustrated. Among them *Monodictys trichocladiopsis* Goh and Hyde is an addition for the fungi of India. *Rhexoacrodictys erecta* (Ellis and Everh.) Baker and Morgan-Jones is being recorded for the first time from freshwater habitats in India. *Cancellium applanatum* Tubaki, *Cirrenalia indica* Vasant Rao and Reddy and *Torula caligans* (Batista and Upadhyay) Ellis are being recorded for the first time from Maharashtra state.

## Materials and Methods

Samples of submerged woody debris and leaves were collected randomly during 2012-13 from different lentic and lotic habitats from North Maharashtra region. The samples were placed in plastic bags. On returning to the laboratory, samples were incubated in plastic boxes and kept moist by spraying with distilled water and periodically examined for presence of fungal growth. Permanent voucher slides of fungi were prepared according to the method “double cover glass” provided by Volkmann-Kohlmeyer and Kohlmeyer (1996). Identifications of isolated fungi were confirmed with the help of Tubaki (1975), Zhao et al. (2012), Rao and Reddy (1978), Rao et al., (2004), Goh and Hyde (1999), Roldon and Honruba (1989), Hyde and Goh (1999) and Ellis (1971). Reports of fungi studied were confirmed with the help of Bilgrami et al. (1991), Jamaluddin et al. (2004) and relevant literature.

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SYSTEMATIC ACCOUNT:

1) *Cancellium applanatum* Tubaki

*Trans. Mycol. Soc. Japan*, 16: 357-360 (1975).

*Colonies*: on natural substrate effuse, black, shiny. *Mycelium:* immersed and superficial, composed of septate, subhyaline to hyaline, smooth-walled hyphae, 1.5-3 µm wide, irregularly swollen or tubular, thin or thick-walled. Conidiophores: Micronematous, short. *Conidiogenous cells*: terminal, integrated, determinate, cylindrical, subhyaline. Conidia: acrogenous, solitary, dictyosporus, strongly flattened, fan-shaped, brown to black, shiny, composed of 20-30 parallel adhearnt rows of septate branches radiating from the attachment point, 120-180 µm long, 85-132 µm wide and 20-35 µm thick.

Habitat: On submerged wood, Girna River (Ekalahare, Tal.- Kalwan, Dist.- Nashik), 13 November, 2012; Leg., B.D. Borse

Distribution in India:- Andhra Pradesh: (Rao et al., 2004); Maharashtra: Present studies.

Remarks: The present fungus is rare in occurrence. The descriptions and measurements of conidia and conidiophores are completely agreed with that of *Cancellium applanatum* Tubaki (1975) and as provided by Zhao et al. (2012). Therefore, it is assigned to that species. It is being recorded for the first time from Maharashtra state.

2) *Cirrenalia indica* Rao & Reddy

*Indian J. Mycology. Res.*, 16: 306-308 (1978).

*Mycelium:* superficial, septate, scanty developed, smooth, 2-7 µm broad, irregularly swollen or tubular, thin or thick-walled. *Conidiophores:* Micro or semi-micronematous, very small, 2-5 µm broad, sub-hyaline, pink or reddish brown. Conidiogenous cells: terminal, integrated, discrete or indiscrete, monoblastic, 2-5 µm long, 2-4 µm broad, cylindrical or small tubular, smooth. *Conidia:* acrogenous, monoblastic, holoblastic, 2-3 celled, first two cells very small, last cell profusely inflated, 5-15 µm long, 2-3 µm broad at the base, 5-10 µm broad at the broadest, rounded apex, reddish brown, thick-walled, smooth, curved.

Habitat: Tapi River (Bhusawal, Dist.-Jalgaon), 26 January, 2013; Leg., V.R. Patil ,L.C.Nemade

Distribution in India:- Andhra Pradesh: On unidentified leaves from freshwater body (Rao and Reddy, 1978); Maharashtra: Present studies.

Remarks: The present fungus is occasional in occurrence. The descriptions and measurements of conidia and conidiophores are completely agreed with that of *Cirrenalia indica* Rao and Reddy (1993) and as provided by Rao et al., (2004). Therefore, it is assigned to that species. It is being recorded for the first time from Maharashtra state.

3) *Monodictys trichocladiopsis* Goh & K.D. Hyde

*Fungal Diversity*, 3: 57-85 (1999).

*Colonies:* on natural substratum effuse, black, glistering. Mycelium: partly superficial and partly immersed, comprising subhyaline to pale yellowish brown, 1.5-2 µm wide, smooth or verrucose, septate, branched hyphae. *Conidiophores*: micronematous. Conidial sucession: rhexolytic. *Conidia*: borne on undifferentiated hyphae, solitary, scattered or in loose clumps, ellipsoidal or pyriform, smooth-walled, 30-40 x 20-25 µm, black, dictyoseptate, septa often obscured by the dark pigmentation; basal cell subglobose, yellowish brown, 4-5 µm diam.

Habitat: On submerged wood; Tapti River (Gidhade, Dist.- Dhule), 26 January, 2012; Leg., S.Y. Patil

Distribution in India:- Maharashta: Present studies.

Remarks: The present fungus is common in occurrence. The descriptions and measurements of conidia and conidiophores are completely agreed with that of *Monodictys trichocladiopsis* as given by Goh and Hyde (1999). Therefore, it is assigned to that species. It is being recorded for the first time from India.

4) *Rhexoacrodictys erecta* (Ellis & Everh.) Baker & Morgan-Jones
Mycotaxon, 82: 95-113 (2002).
≡*Mystrosporium erectum* Ellis & Everh., J. Mycol., 4: 53, 1888.
≡*Mystrosporium erectum* (Ellis & Everh.) Pound &Clem., Bull. Geol. Nat. Hist. Surv. Minn., 9: 657, 1896.
≡ *Acridictys erecta* (Ellis & Everh.) M.B. Ellis, Mycol. Pap., 79: 12, 1961.
≡*Piricauda serendipita* R. T. Moore, Rhodora, 61: 104 (1959).
≡*Acridictys satwalekari* D. Rao, Curr. Sci., 5: 117 (1970).
*Colonies:* effuse, hairy, black, usually rather thin. Mycelium: partly superficial to predominantly immerse in the substrate, composed of branched, septate, pale to mid brown, smooth, cylindrical 2-4.5 µm wide hyphae: with intercalary cells from which conidiophores arise, often becoming inflated, thicker-walled and rather dark brown. Conidiophores: macronematous, mononematous, single, solitary, or in a cluster of up to three, arising in close proximity on the hyphae, erect, straight or somewhat flexuous, smooth, septate, with septa appreciably thiner than the periclinal wall, thick-walled, cylindrical, inflated toward a 5-7 µm wide base, brown to dark brown, tapering slightly and paler distally a 3.5-5 µm wide distal portion, with a narrow, unpigmented, annular zone immediately subtending the septum delimiting the terminal cell and sometimes the penultimate cell, intermediate, often elongating, usually once or twice, by regenerative, percurrent growth through a torn, open-ended apex following each conidial detachment, mostly up to 65 µm long. *Conidiogenous cells:* integrated, terminal, monoblasic, pale brown, becoming detached with the conidia by a split at a circumscissile, immediately subtending, dehiscence zone. *Conidia:* holoblastic, solitary, dry, acrogenous, obovate or, rarely, subspherical, dictyosporous with many predominantly obliquely septa, thick-walled, smooth, brown to blakish brown, darker in the upper reaches when mature, with a short, pale, truncate conidiogenous cell bearing a marginal frill remaining attached as a protuberant basal element, 24-39 x 15-29 µm in size, seceding rhexolytically.
Habitat: On submerged wood; Tapi River (Bhusawal, Dist.-Jalgaon), 26 January, 2013; Leg., V.R. Patil ,L.C.Nemade
Distribution in India:- Distribution:- Maharashtra: On dead stem of Smilax macrophylla (Desai and Patwardhan, 1974); Himachal Pradesh: On dead stock of *Zea mays* (Sharma and Munjal, 1979); Maharashtra: On submerged wood (Present studies).
Remarks: The present fungus is common in occurrence. The descriptions and measurements of conidia and conidiophores are completely agreed with that of *Rhexoacrodictys erecta* as given by Baker et al. (2002). Therefore, it is assigned to that species. It is being collected in freshwater habitats for the first time from India.

5) *Torula caligans* (Batista & Upadhyay) Ellis
*Dematiaceous Hyphomycetes*, 337 (1971).
= *Bahusandhika caligans* Batista & Upadhyay, *Atas Inst. Micol*., 2: 321 (1965).
*Colonies:* on natural substratum effuse, velvety, gretish olive, olivaceous brown or dark brown. Mycelium: superficial, thin or thick-walled, subhyaline to reddish brown, septate, branched. Conidiophores: micronematous, mononematous, integrated, indiscrete, terminal or lateral, 1-2 µm thick. *Conidiogenous cells*: thin-walled, fertile, where as lower part thick-walled, sterile, may be terminal or the apical cell of the phragmo-conidium or lateral, 3-4 µm wide. Conidia: broadly fusiform to ellipsoidal, almost always 3-septate, constricted at the septa, verruculose or echinulate, end cells small, hyaline or pale, intermediate cells much bigger, mid to dark olivaceous brown, 17-25 µm long, 7-9 µm thick in the broadest part.
Habitat: On submerged wood, Girna River

(Ekalahare, Tal.- Kalwan, Dist.- Nashik), 13 November, 2012; Leg., B.D. Borse

Distribution in India:- Tamil Nadu: On wood test blocks submerged in a cooling tower water system (Udaiyan and Manian, 1991); Maharashtra: Present studies.

Remarks: The present fungus is rare in occurrence. The descriptions and measurements of conidia and conidiophores are completely agreed with that of *Torula caligans* (Batista & Upadhyay) Ellis as given by Ellis (1971). Therefore, it is assigned to that species. It is being recorded for the first time from Maharashtra state.

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Fig legends:

Fig. 1. Conium of *Cancellium applanatum*

Fig. 2. Conidia of *Cirrenalia indica*

Fig. 3. Conium of *Monodictys trichocladiopsis*

Fig. 4. Conium of *Rhexoacrodictys erecta*

Fig. 5. Conidia of *Torula caligans*

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